Checklist for Electronics and Electronic Construction Departments

Items/Processes of Concern	Toxic Metal	Dangerous Waste	Preferred Alternatives and Best Management Practices[1]
Soldering	Lead	X	• **Use SAC solder[2] (contains 95.5% tin, 3.9% silver, and 0.6% copper).** • **Use ECA polymers[3] (contains metal flakes, such as silver).** • **Use cadmium-free filler metals when fluxing.** • **Use alternative fluxes to reduce volatile organic compound emissions or avoid post cleaning.** • Optimize flux delivery. • Optimize heating or filler metal. • Process redesign to incorporate mechanical fastening rather than soldered connections.
Wipes		X	• **Do not use pre-moistened alcohol wipes for cleaning.** • Use refillable pump bottles to apply isopropyl alcohol to wipes.
Solder scrap	Lead	X	• Recycle solder pieces as scrap metal. • If not recycled, manage as dangerous waste.
Waste circuit boards **Computers** **Electronic equipment** **Appliances**	X	X	• **Use energy-efficient computer and electronic equipment, and appliances.** • **Use vendor take-back programs.** • Surplus old equipment. • Recycle waste circuit boards and other electronics as Universal Waste. • If not recycled, manage as dangerous waste.
General			
General inventory			• **Use Environmentally Preferable Purchasing.** • Review Material Safety Data Sheets (MSDSs) for hazardous substance information. • Properly store hazardous substances. • Review curriculum to include design and production of lead-free circuit boards.

[1] Preferred alternatives are shown in **bold font**.

[2] SAC solder is a lead-free metal alloy that consists of tin, silver, copper (**S**n,**A**g,**C**u). All alternatives to lead-based solder require investigation to determine their suitability for use in certain applications. Other considerations for the substitution of the lead solder alternatives are temperature ranges, the amount of energy input required to apply the alternatives, changes in production time for higher temperature applications, and conditions for consumer use of finished products. Research has to be done for operating temperature range, shock resistance, and moisture exposure.

[3] ECA polymers are electrically conductive adhesives (ECA) that "stick" components onto a substrate, in effect, replacing the solder.

Items/Processes of Concern	Toxic Metal	Dangerous Waste	Preferred Alternatives and Best Management Practices[4]
All generated waste streams **Spilled products** **Unused and expired products**	X	X	• **Use chemical inventory and tracking software to centralize product ordering, improve product tracking, storage requirement, waste management, reduce disposal of expired product, and minimize duplicate orders to prevent unnecessary disposal.** • Identify all potential waste streams and establish designation procedures to determine if a hazardous waste or non-hazardous waste. • Implement dangerous waste designation, collection, accumulation, and disposal procedures for all waste streams. See Common Dangerous Waste Compliance Issues.
Batteries **Fluorescent lamps**	X	X	• **Use rechargeable batteries.** • **Use LED lamps when appropriate.** • **Use low-mercury fluorescent lamps.** • Implement a battery recycling program and recycle as Universal Waste. • Implement a whole-lamp recycling program and recycle as Universal Waste. • If not recycled as Universal Waste: collect, manage and dispose of as dangerous waste.
Other:			

Notes, Comments, Follow-up

[4] Preferred alternatives are shown in **bold font**.

Resources

Common Dangerous Waste Compliance Issues: http://www.ecy.wa.gov/programs/hwtr/P2/schoolsAndLabs/tool/dw_issues.html

Dangerous Waste Basics: http://www.ecy.wa.gov/programs/hwtr/manage_waste/DangerousWasteBasics.html

E-Cycle Washington: http://www.ecy.wa.gov/programs/swfa/eproductrecycle/

Treatment by Generator: http://www.ecy.wa.gov/programs/hwtr/P2/schoolsAndLabs/tool/TBG.html

Universal Waste Rule for Batteries, WAC 173-303-573(2): https://fortress.wa.gov/ecy/publications/SummaryPages/98407a.html

Universal Waste Rule for Lamps, WAC 173-303-573(5): https://fortress.wa.gov/ecy/publications/SummaryPages/98407c.html

Universal Waste Rule for Mercury-containing Equipment, WAC 173-303-573(3,4): https://fortress.wa.gov/ecy/publications/SummaryPages/98407b.html